STAT 522 – ADVANCED BAYESIAN STATISTICS
Modern Topics in Bayesian
Statistics Rice University – Spring 2016
Cross-listed as GS 01 1203

SYLLABUS

Instructors

Michele Guindani Assistant Professor MD Anderson Cancer Center Email: mguindani@mdanderson.org phone: (713) 563-4285 Office hours by appointment only	**Francesco Stingo** Assistant Professor MD Anderson Cancer Center Email: fstingo@mdanderson.org phone: (713) 563-4282 Office hours by appointment only

Course website: http://odin.mdacc.tmc.edu/~mguindani/Teaching/teaching.html

Time and Days: 02:30PM - 03:45PM MW MEL 254.

Attendance: Students should register for the course through Rice University. Those who wish to audit the course should obtain written permission from the Instructors.

Course Description: This course covers modern topics in Bayesian statistical analysis at a level that goes beyond the introductory course. Therefore knowledge of basic Bayesian statistics is assumed (at the level of "A first course in Bayesian statistical methods", by Peter Hoff (Springer, 2009). Familiarity with basic posterior simulation methods (MCMC, Gibbs sampler and Metropolis-Hastings) will be assumed. The course will consist of a number of major modules. For each module, there will be introductory lectures from the Instructors and then readings and class presentations/discussions from the students. The final project will be an analysis of data with models/methods covered in class. Throughout the course, familiarity with some software (R, C, C++, WinBUGS or Matlab) will be assumed. Throughout the course models and computational methods will be introduced with emphasis on applications to real data problems.

Pre-requisites: Stat422-622 (Bayesian analysis).

Course Assignments: The course will be co-taught. Instructors will alternate through the semester. Readings and class presentations will be assigned. The course grade will consist of 50% for the class presentations and 50% for the final project. Final projects will consist of an analysis of new data using models/methods covered in class.

Tentative Course Schedule

Week		
G 1 : 1/11- 1/13	Review of MCMC	Adaptive Metropolis Hastings
G 2 : 1/18-1/20	MLK day	Multiple Chains/Try MCMC
G 3 : 1/25- 1/27	Slice Sampler	Hamiltonian MCMC
S 4 : 2/1- 2/3	Review of Bayesian variable selection	Computational aspects and applications
S 5 : 2/8- 2/10	Intro to GP	Bayesian inference for GP regression
S 6 : 2/15-2/17	Intro to Spline	Bayesian inference for Spline
7 : 2/22-2/24	Class presentations	Class Presentations
8 : ########	SPRING BREAK	SPRING BREAK
9 : 3/7-3/9	TBD	TBD
G 10 : 3/14- 3/16	Finite and Infinite Mixtures	Dirichlet Process and Mixtures
G 11 : 3/21-3/23	Species Sampling Priors (SSP)	Applications - 1
G 12 : 3/28- 3/30	Sampling from SSP	Applications – 2
S 13 : 4/4-4/6	Intro to Graphical models - 1	Intro to Graphical models - 2
S 14 : 4/11-4/13	Bayesian Graphical models - 1	Bayesian Graphical models – 2
S 15: 4/18 – 4/20	Multiple graphical models	Matrix-variate graphical models

Textbook

There will be no major textbook. Lectures will be based on a series of papers that will be made available to the students.

Honor Code Policy

Students are encouraged to talk to each other, the teaching assistants or the instructor about any homework assignment. This assistance is limited to the discussion of the problem. Students are not allowed to look at homework problems or solutions or quizzes/exams from previous years. On written exams you will be asked to write and sign the honor code pledge. With your signature, you pledge that you have not been in communication about this exam with anybody, neither with any other student in the class, nor with any other person, other than the instructor. Questions about grades on homework/midterm papers should be brought to the attention of the Instructor within 5 days from the date you receive the graded papers.

Any student with a documented disability needing academic adjustments or accommodation is requested to speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact Disability Support Services in the Ley Student Center.